ECE 345/ME 380: Introduction to Control Systems

Collaborative Quiz #3

1.1 Location of poles and zeros of G(s)

```
num1=[1]; den1=[1 7 12 0];roots(den1)
```

```
ans = 3x1
     0
    -4
    -3
```

1.3 Step response of the open-loop system

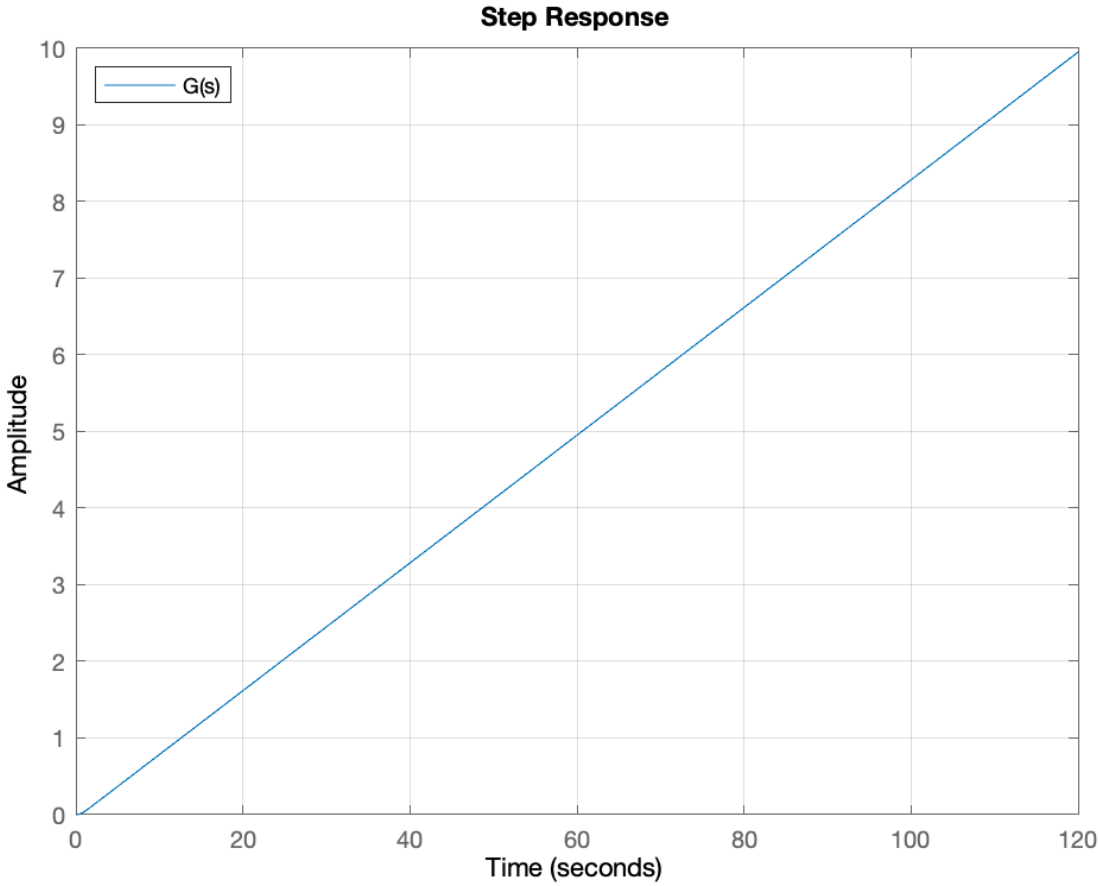
```
sys1=tf(num1,den1)
```

```
sys1 =

          1
  ------------------
  s^3 + 7 s^2 + 12 s

Continuous-time transfer function.
```

```
step(sys1);grid;legend('G(s)','location','northwest')
```



2.5 Step response of the closed-loop system with K=100 over 0 to 20

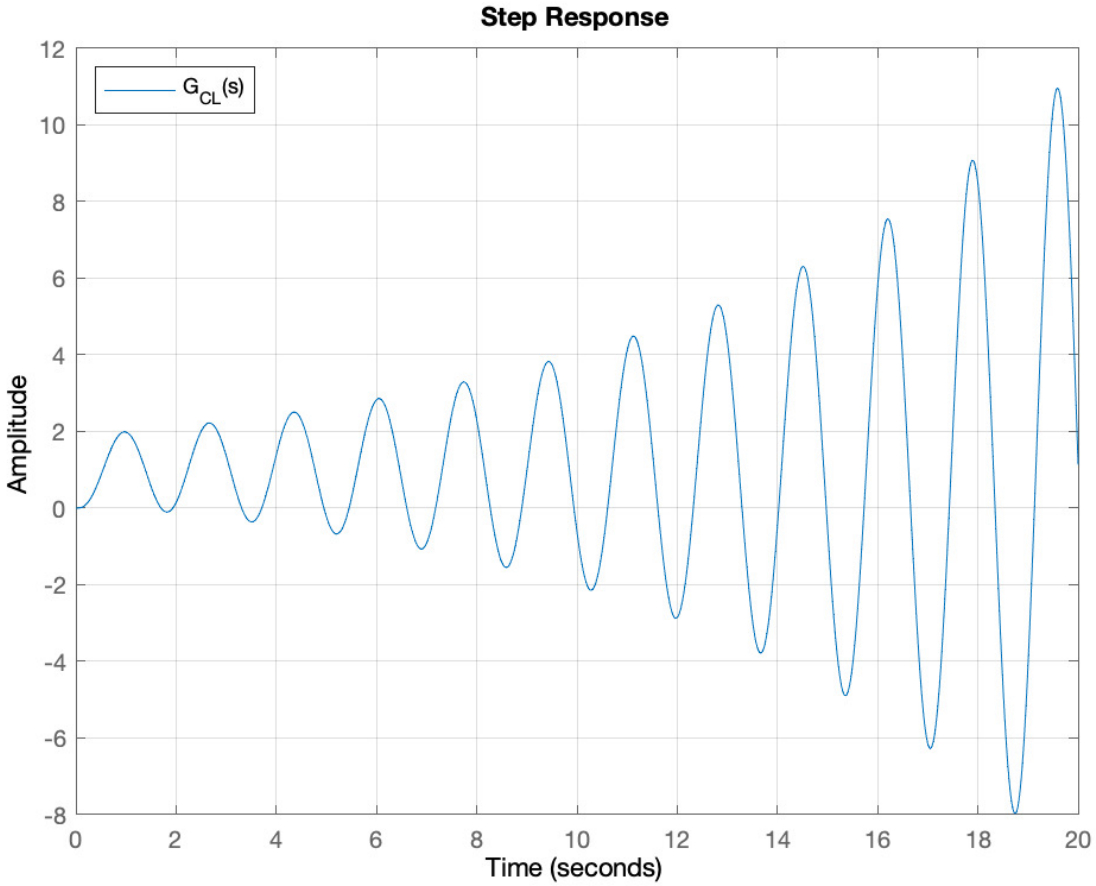
```
K=100;tfinal=20;
sys2=K*feedback(sys1,K)
```

```
sys2 =

            100
  ------------------------
  s^3 + 7 s^2 + 12 s + 100

Continuous-time transfer function.
```

```
t=0:0.01:tfinal;
step(sys2,t);grid;legend('G_{CL}(s)','location','northwest');legend('G_{CL}(s)')
% legend called twice to fix subscript bug
```


Step Response
G_CL(s)
Amplitude
Time (seconds)
12
10
8
6
4
2
0
-2
-4
-6
-8
0
2
4
6
8
10
12
14
16
18
20